
GREEN
being green
is just half of the story
CIRCLE
shopping center

“Harmony with land
is like harmony with a friend;
you cannot cherish his right hand
and chop off his left.”

–Aldo Leopold

being green

GREEN

is just half of the story

CIRCLE

shopping center

native plants on the green roof

beautiful, clean & profitable

THE GREENEST SHOPPING CENTER IN AMERICA

Before the Green Circle existed as an actual place, it existed as a hypothetical dream, one that would serve as an example, a new direction for the future of retail businesses. It would be a showcase of sustainability *and* profitability. Every detail would be considered, options weighed, and new territory explored to find what would ultimately become the first platinum LEED certified* shopping center in America.

what that means for the environment

From the storm water that enters the property, to the energy saved from utilizing new, sustainable building techniques, each aspect of the building was examined by experts in the field. The buried cistern holds collected rainwater that is used for flushing toilets. The large bank of energy efficient windows lets natural light in year-round, while the angle is designed to take advantage of the passive solar heat gain in the winter. Storm water penetrates the pavement, rather than running off, helping to recharge the ground water. The rooftop garden insulates the building while minimizing the "heat island" effect of most buildings in major metropolitan areas. All of these measures make this site a marvel of eco-design.

* The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is a third-party certification program and the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

what that means for the bottom line

Ultimately, the success of the project can be measured not only in environmental impact, but in actual dollars. Each of these measures not only creates a lighter footprint, it creates a heavier wallet. For instance, the overall cost of energy used is reduced by 60%. The exceptional efficiency of the lot at processing storm water means more retail space, because none of the area had to be sacrificed for a detention pond.

Retailers also benefit from the exclusive, eco-chic location. Staff is happier with a daily dose of sunshine inside and natural light promotes a happier shopping experience for consumers as well.

As the cost of energy rises, businesses will look at ways to best minimize their bottom line. Reducing operating expenses is a major factor and buildings like Green Circle will have a distinct advantage in their ability to offer more efficient space.

STORM WATER MANAGEMENT

Urban development has a profound effect on the quality of its watershed. Trees and grasses that intercept and absorb rainwater, change the hydrology of a site when they are removed and the site is graded to a uniform slope. When rooftops, roads, parking lots and other impervious surfaces are implemented, rainfall is converted directly to runoff, which carries with it pollution in the form of debris, chemical residue, fertilizer and more. This non-point source pollution wrecks havoc on local waterways, while the increased volume of water causes erosion and flooding.

The Green Circle Shopping Center, located in the Ward Branch Watershed (part of the larger James River Basin,) utilizes a comprehensive storm water management plan. Minimizing storm water runoff and pollution from the site is coordinated through limiting the amount of impervious surfaces, planting native vegetation to filter and slow runoff, using natural alternatives to fertilizers, installing a green roof and cistern, and controlling erosion and sedimentation during construction activities.

permeable surfaces

Pervious pavement is a mixture of coarse aggregate, cement and water that allows for rapid infiltration of water and overlays a stone aggregate reservoir. The high porosity is attained by a highly inter-connected void content that functions well with little to no maintenance. Capturing storm water and allowing it to seep into the ground recharges groundwater, reduces runoff, and eliminates the need for detention ponds, which can lower costs. Field tests show the void content for Green Circle Shopping Center to be between 17% -21% after compaction.

Instead of running off, rainwater passes through permeable pavement.

photo courtesy Gaia Engineering

Subsurface detention provides temporary storage for the 100-year, 24-hour storm event as runoff infiltrates into underlying permeable soils and out through a sub-drain system at a rate of one-half inch per hour. The porous concrete was primarily designed to manage storm water runoff for the development, but is also improving storm water quality by removing approximately 90% total suspended solids, 65% total phosphorus, and 85% total nitrogen.

underground cistern

For the water that cannot penetrate the ground, there is a rainwater collection system in place. Rainwater harvesting is the process of collecting rainwater from impervious surfaces for later usage. This system is comprised of a catchment surface, debris filtration and holding tank. In urban areas, capturing and using rainwater helps mitigate flooding caused by high amounts of runoff and provides supplemental water the City would normally provide. The roof of the Green Circle Shopping Center is the rainwater catchment surface. A piping system channels the rainwater through a screen into a partially buried

installation of the cistern

10,000-gallon cistern located on the west side of the building. A pump system delivers rainwater to flush all toilets inside the building, resulting in a 70% reduction annually of domestic water use, or 3.5 million gallons of water. Irrigation for the vegetated roof will also come from the cistern, creating additional savings. The remaining water that falls on the pervious parking lots will infiltrate naturally into the earth.

green roof

A green roof is a 'contained' vegetated space on top of a complex waterproofing system and human-made structure below, above or at grade and can be intensive, semi-intensive or extensive in design. Intensive designs have a soil depth of a foot or more and require irrigation and maintenance, while extensive roofs are self-sustaining in about four to six inches of aggregate and need little to no maintenance. Each green roof is unique and designed to meet multiple objectives and performance goals. The roof on Green Circle has 4,200 square feet of eight-inch deep, semi-intensive roof aggregate that can hold approximately 5200 gallons of rainwater. Landscaping is comprised of native Missouri plants including perennials, shrubs, and a flowering dogwood tree. The plants help recreate the hydrologic function of open space by capturing and holding rainwater, slowing direct storm water runoff velocity, improving air and water quality, and promoting energy conservation. This new area not only enhances the beauty of the space, it acts as an educational tool, showing the benefits of native plants and rooftop plantings. The additional thickness of the roof from structure and soil acts as a sound barrier as well, buffering the noise from the street below.

OTHER FEATURES

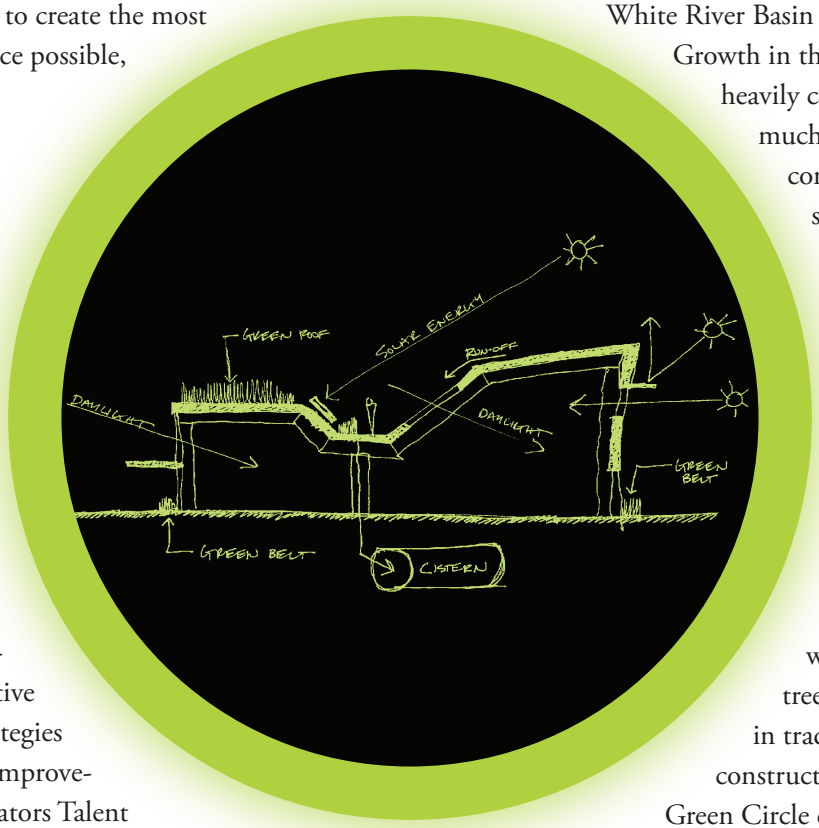
Large, efficient windows allow the space to fill with natural light, while the angle and placement of the windows take advantage of the winter sun's heat. The thickness of the green roof insulates against sound and extreme temperatures. Sections of the roof are designed to accommodate solar panels in the future. All of these measures, along with the extensive storm water management systems, ensure that this project will remain a feat of eco-technology, not just now, but for generations to come.

THE DESIGN PROCESS

planning

Guided by their love of the environment and their business savvy, Matt and Lindsay O'Reilly created this project to function both as an educational tool and a profitable enterprise. This brother/sister duo met with planners and architects from the Hufft Project, and began brainstorming ways to create the most efficient retail business space possible, without sacrificing profit.

Their goal was high: to attain LEED certification of platinum, the highest LEED certification available. After many revisions, the design was finalized and put into motion.



funding for the project

Green Circle received a $192,000 grant from James River Basin Partnership to implement innovative storm water reduction strategies under the Water Quality Improvement Plan, funded by Senators Talent and Bond and administered by Environmental Resources Coalition, which provides the cost-share opportunity to projects located in the Upper White River Basin. The project is also anticipating a federal tax credit from the Federal Energy Act of 2005 which should net approximately $40,000 in valuable tax credits.

site description

Green Circle is a 23,000 square foot retail shopping center situated on 1.7 acres at Republic Road and National Avenue, in south Springfield, Missouri. The development is located in Greene County within the James River Watershed and part of the Upper White River Basin covering southwest Missouri. Growth in the Springfield area has been heavily concentrated in the south, with much more development planned to come to the southeast, south, and southwest portions of the city. Transportation access to the shopping center is largely by automobile, and a bus stop is located directly across Republic Road.

To save the existing trees on the site, Hufft: Projects of Prairie Village, Kansas, designed and situated the building in a way that preserved 40 plus trees that would be demolished in traditional design and construction practices.

Green Circle development is designed not only to eliminate point source pollution from the site, but to improve the storm water leaving the site by employing natural filtration methods. A concerted effort toward promoting community education to advance knowledge about the local watershed and personal water use makes Green Circle a working model of sustainable growth.

its all about the green

ABOUT ECONOMICS

gains on several fronts

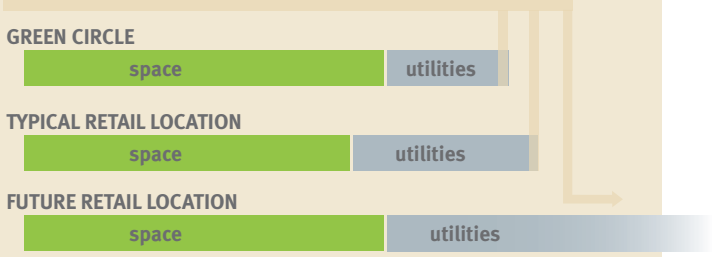
The economics of a revolutionary building such as this are difficult to measure. Its unique and progressive nature creates a demand that ensures constant occupancy, while its efficiency means that the overall lease rate remains competitive, as tenants are paying far less for energy usage. Leasable space is increased because storm water runoff is minimized. All of these gains add up to long-term profits.

total costs vs. superficial costs

At first glance, Green Circle's construction costs seem high for this market, but when taken as a whole, these costs are comparable, if not less than traditional building costs. The architecture, structural and mechanical engineering are large components to the additional construction costs, but also largely responsible for the fast payback period Green Circle is expecting. For example, the structural layout of the building is designed to support the green roof and dining on the mezzanine. While this is an increased cost, the green roof has double the expected lifespan, adds insulation and increases heating and cooling operating efficiency when compared to a traditional roof. The mezzanine is an additional 4,000 square feet of leased area.

The roof design and other high performance features, including water saving fixtures and energy efficient design of the building shell and heating and cooling systems, will be paid back within 7-8 years at today's energy and current lease rates. Because the building is close to 60% more energy efficient than another space of similar size, the increasing costs of energy will drastically reduce the payback period.

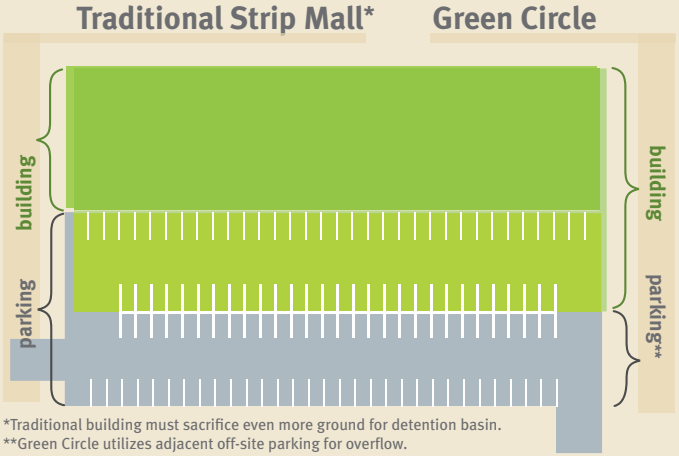
Total Overhead for Retail Space



Green building costs are initially higher, however, when taken with the overall operational cost, the ratio between utilities and space quickly favors the green building over the conventional space, especially in light of rising energy costs.

more building per buck

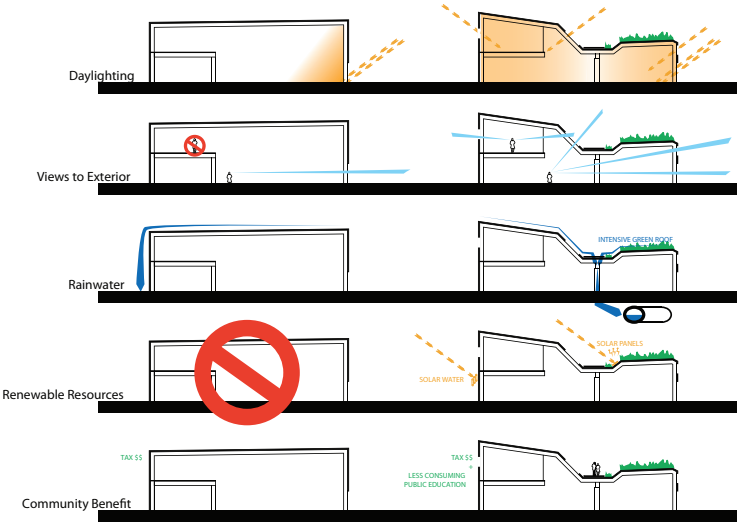
One of the most intriguing financial aspects is the building to land ratio. Green Circle sits on a *much* higher proportion of the lot than other commercial projects. This is achieved by minimizing the size of detention through use of pervious surfaces and other storm water *Best Management Practices* (BMP)– pervious concrete, green roof, vegetated swales, rainwater collection and reuse. These BMPs, paired with shared parking at the neighboring church, reduce site costs by approximately 30% and allows the project to use a larger building than would normally be allowed on a lot of this size. Green Circle makes rent on building space, not on ponds and parking lots.



*Traditional building must sacrifice even more ground for detention basin.
**Green Circle utilizes adjacent off-site parking for overflow.

traditional strip mall vs. green circle

Behaving more like a "Lifestyle Center" than a strip mall, Green Circle uses its sustainable features to offer a premium product and premium space to its tenants and patrons. The building is a departure from the typical retail box with windows on the front.



From 95% of the space, occupants can see outside, a feature that has been proven to increase employee productivity, well-being, and even contribute to increased sales. The layout of the building's window systems also provides for fantastic "daylight harvesting". Combined with lights that automatically dim to the amount of available daylight, the space saves roughly 50% of energy on lighting, providing a naturally lit atmosphere that maintains the connection to the outside world, instead of severing it.

The shape of the building that allows for maximum daylight and views is also conducive to harvesting water from the roof. Calculations show Green Circle uses 73% less potable water for flushing toilets and irrigation than a typical center of its size.

Finally, in strict adherence to the principle of the Triple Bottom Line, Green Circle offers more to the community than just tax dollars. Through tour programs, an educational website, and by its existence alone, Green Circle is serving as a social and environmental education tool to its patrons, the building community, and its occupants alike.

publicity

Interest in the Green Circle has been overwhelming. Since construction of this project in February, estimated value of free press coverage is approximately $80,000. Before construction was even completed, 100% of the space was leased. With vacancy rates in the Springfield area averaging approximately 20%, this result is astonishing.

benefits to tenants

Why would a developer build a super efficient shopping center when he or she is not the one to realize the savings? The answer is simple. Aside from being a premium retail space, Green Circle offers a form of cost control that is becoming more and more important… the utility bill.

All businesses are forced to control their overhead, and minimizing the utility bill is a part of this. While the center is about $1/s.f. less to heat, cool, and light today, rising energy costs will inevitably make those savings much greater in the near future. While being a part of a synergistic retail environment the tenants can also save money while watching their increasing energy savings year to year. Keeping the variable costs in control is well worth the additional rent, but having low utility bill is just part of it.

With the synergistic mix of a pilates and yoga studio, an outdoor gear store, natural market, coffee and smoothie bar, and a casual dining establishment, an environment is set where the customers of one tenant are invariably the customers of all of the tenants. This internal synergy is a realm of sustainability that has yet to be studied, but is certain to contribute to increased customer flow, sales, and inevitably a more healthy tenant. That's good for everybody!

summary

At the time of this publication, Green Circle has been open for less than three months as a fully-functioning business space, yet already the benefits are evident: energy costs are over 60% lower than traditional spaces, and, unlike several nearby developments *and* in spite of record-breaking rainfall, storm water runoff on this site has been easily managed by the implementation of these new, low-impact solutions.

The pervious parking lot continues to fill up every day with cars, and has maintained its perviousness and structure through a full and hard winter, establishing it as a viable and affordable urban alternative to oil-based asphalt and detention ponds.

In business, while being green can be half the story, making the green is the other. It's clear that the two can venture hand in hand and prove that perhaps green building is not so much a novelty for the future, as it is a necessity.

for more details

To download the case study for a more detailed overview of the project, or for more information about the project, visit **greencircleshoppingcenter.com**.

A note from jrbp

The James River Basin Partnership (JRBP) was entrusted with a grant from the Water Quality Improvement Project (WQIP) to implement new storm water management practices. After searching for the perfect project for nearly a year, JRBP announced the *very* first urban project to come from the WQIP: the Green Circle Shopping Center. It would become an accessible, functioning, commercially-viable example for builders, business owners, and individuals alike.

Funding allocated to the Green Circle project was used to help install a cistern, green roof, and permeable pavement. The goal of these measures was to reduce harmful runoff, however, we were happy to see that all of these measures together have far surpassed expectations, virtually *eliminating* runoff, even during the heaviest of rainfall events!

James River Basin Partnership is proud and grateful to be a part of this revolutionary project.

This publication was funded by the WQIP in the hopes that this project might educate and inspire others.

This booklet was printed on paper made from 100% reclaimed, post-consumer waste, which was processed without chlorine. The printing process is waterless, eliminating the need for harsh solvents and chemicals. The presses are cleaned with a mild soap and water. The choices made for this resulted in the following savings to our environment*:

- 0.45 trees preserved for the future.
- 1.30 lbs of water-borne waste not created.
- 191.9 gallons of wastewater flow saved.
- 21.27 lbs of solid waste not generated.
- 41.79 lbs of greenhouse gases prevented.
- 320K BTUs of energy not consumed.

* according to the online calculator from Green Printer.

special thanks

to all the partners and visionaries who helped make this project possible